WHAT IS CLAIMED IS:

1. A radiation beam recording system for exposing a photoresist master disc having a photoresist layer formed over a substrate for making a hybrid optical recording disc having a read only (ROM) portion and a writable portion, comprising:

a) at least one radiation source which provides first and second radiation beams projected along first and second beam paths, respectively, each beam having a wavelength or energy selected to provide activating radiation for exposing a pattern in the photoresist layer formed over the substrate of the master disc;

b) a first modulator for modulating an intensity of the first radiation beam and disposed along the first beam path, such intensity modulation having an intensity for exposing depressions in the photoresist layer in correspondence with data to be recorded;

c) a second modulator for frequency-modulating the second radiation beam and disposed along the second beam path, such frequency modulation providing a wobble-frequency to cause an exposed groove in the photoresist layer to be a continuous wobbled groove;

d) means for combining the modulated first and second radiation beams and for projecting the combined radiation beams onto the photoresist layer for exposing the photoresist layer to form the exposed continuous wobbled groove and a track of exposed depressions along the wobbled groove; and

e) a modulation control system for controlling the operation of the first and the second modulator to concurrently form the exposed continuous wobbled groove and the track of exposed depressions along the wobbled groove in the ROM portion.

2. A laser beam recording system for exposing a photoresist master disc having a photoresist layer formed over a substrate for making a hybrid

optical recording disc having a read-only memory (ROM) portion and a writable portion, comprising:

a) at least two optical modulators which collectively provide the functions of intensity- and frequency-modulating at least one laser beam to provide an exposed groove, exposed depressions in the groove, and wobble information on the sides of the groove in the photoresist layer by exposing a pattern in the photoresist layer; and

b) a laser beam modulation control system for controlling the operation of the optical modulators to form a continuously frequency-modulated exposed groove with exposed depressions in the ROM portion of the exposed groove.

3. A laser beam recording system for exposing a photoresist master disc having a photoresist layer formed over a substrate for making a hybrid optical recording disc having a read only (ROM) portion and a writable portion, comprising:

a) at least one laser which provides first and second laser beams projected along first and second beam paths, respectively, each beam having a wavelength or energy selected to provide activating radiation for exposing a pattern in the photoresist layer formed over the substrate of the master disc;

b) a first modulator for modulating an intensity of the first laser beam and disposed along the first beam path, such intensity modulation having an intensity for exposing depressions in the photoresist layer in correspondence with data to be recorded;

c) a second modulator for frequency-modulating the second laser beam and disposed along the second beam path, such frequency modulation providing a wobble-frequency to cause an exposed groove in the photoresist layer to be a continuous wobbled groove;

d) means for combining the modulated first and second laser beams and for projecting the combined radiation beams onto the photoresist layer

for exposing the photoresist layer to form the exposed continuous wobbled groove and a track of exposed depressions along the wobbled groove; and

e) a laser beam modulation control system for controlling the operation of the first and the second modulator to concurrently form the exposed continuous wobbled groove and the track of depressions along the wobbled groove in the ROM portion thereof.

4. The laser beam recording system of claim 3 wherein the at least one laser provides the first and second laser beams by means for splitting a laser beam from the at least one laser into the first and second laser beams.

5. The laser beam recording system of claim 3 wherein the first and second laser beams are provided by a first and a second laser, respectively.

6. The laser beam recording system of claim 3 wherein the second optical modulator includes means for selecting an intensity level of the second laser beam so that a selected width dimension of the exposed wobbled groove can be provided.

7. The laser beam recording system of claim 3 wherein the first and second laser beams have a wavelength in a range from 350 to 450 nm, the photoresist layer is formed of a positive-working photoresist material, and the photoresist layer has a thickness in a range from 290 to 350 nm.

8. The laser beam recording system of claim 3 wherein the laser beam modulation control system includes at least logic means for temporally correlating drive signals provided to the first and second optical modulators.

9. The laser beam recording system of claim 8 wherein the logic means further includes synchronization (SYNC) pulses which periodically

synchronize a temporal relationship between the exposed wobbled groove and the track of exposed depressions.

10. The laser beam recording system of claim 3 wherein at least some of the exposed depressions within a track of exposed depressions are exposed at positions spaced from a center line of the exposed wobbled groove.

11. The laser beam recording system of claim 2 further including means for rotating the photoresist master disc during exposure of the photoresist layer to the at least one laser beam, and means for radially translating the master disc so that the at least one laser beam incident on the photoresist layer will trace a continuous exposed spiral groove.

12. The laser beam recording system of claim 3 further including means for rotating the photoresist master disc during exposure of the photoresist layer to the first and second laser beams, and means for radially translating the master disc so that the wobbled groove will trace a continuous exposed spiral groove.

13. A radiation beam recording system for exposing a photoresist master disc having a photoresist layer formed over a substrate for making a hybrid optical recording disc having a read only (ROM) portion and a writable portion, comprising:

a) means for modulating an intensity of a laser beam having a wavelength selected to provide activating radiation to expose a pattern in the photoresist layer formed over the substrate of the master disc between a lower intensity for exposing a groove in the photoresist layer and a higher intensity for exposing the groove and a pattern of depressions in the groove in the photoresist layer;

b) means for frequency-modulating the intensity-modulated beam with a wobble-frequency to cause the exposed groove to be a continuously frequency-modulated wobbled groove;

c) a radiation beam modulation control system for controlling the intensity modulation and the frequency modulation to form a continuously frequency-modulated exposed groove with exposed depressions in the ROM portion of the exposed groove.

14. The laser beam recording system of claim 13 further including:

d) means for rotating the photoresist master disc during exposure to the laser beam, and means for radially translating the master disc so that the laser beam incident on the photoresist layer will trace a continuous exposed spiral groove; and

e) a laser beam modulation control system including a clock, an ATIP generator connected to the clock and operative to generate a frequency-modulating ATIP signal, an EFM generator connected to the clock and operative to generate an intensity-modulating EFM signal in correspondence with digital data input signals, and means for controlling temporal relationships between and among the ATIP generator and the EFM generator so that respective ATIP signals and EFM signals are temporally correlated to provide concurrent operation of the intensity- and frequency modulation of the laser beam.

15. The laser beam recording system of claim 13 wherein the means for modulating an intensity of a laser beam includes a low-intensity control signal provided at one input of a laser to provide the lower intensity for exposing the groove, and an EFM flag pulse signal provided at another input of the laser to provide the higher intensity for exposing the pattern of depressions in the groove.

16. The laser beam recording system of claim 13 wherein the means for modulating an intensity of a laser beam includes an optical modulator

operative to the lower intensity for exposing the groove and to provide the higher intensity for exposing the pattern of depressions in the groove.

17. The laser beam recording system of claim 13 wherein the means for frequency-modulating the intensity-modulated laser beam includes an optical modulator.

18. The laser beam recording system of claim 14 wherein the means for controlling temporal relationships include a first logic circuit for creating flag pulses directed from the EFM generator to the ATIP generator, or vice versa, and a second logic circuit for creating flag pulses directed from the ATIP generator to the EFM generator, or vice versa.

19. The laser beam recording system of claim 18 wherein the first and the second logic circuits include TTL logic circuits.

20. The laser beam recording system of claim 14 wherein the means for controlling temporal relationships include a microprocesor controller.

21. The laser beam recording system of claim 14 wherein the EFM generator provides signals to an EFM driver which, in turn, actuates the means for modulating the intensity of the laser beam.

22. The laser beam recording system of claim 14 wherein the ATIP generator provides signals to an ATIP driver which, in turn, actuates the optical modulator for frequency-modulating the laser beam.

23. The laser beam recording system of claim 21 wherein the EFM generator provides a lower level signal to the EFM driver so that a lower intensity laser beam is provided for exposing the groove in the photoresist layer, and the EFM generator provides a higher level signal to the EFM driver in

correspondence with the digital data input signals so that a higher intensity laser beam is provided for exposing the groove and the pattern of depressions in the groove in the photoresist layer.

24. The laser beam recording system of claim 14 wherein the ATIP generator and the EFM generator further provide synchronization (SYNC) pulses which periodically synchronize a temporal relationship between the intensity modulation and the frequency modulation along the exposed spiral groove.

25. The laser beam recording system of claim 14 wherein the means for controlling the temporal relationships is operative to control via flag pulses the timing of release of digital data input signals and the timing and the lower and higher intensity of the laser beam provided by the first optical modulator so that the photoresist layer upon development will have a continuous frequency-modulated spiral groove and depressions within portions of the groove corresponding to data in a ROM area of the master disc.

26. The laser beam recording system of claim 13 wherein the laser beam has a wavelength in a range from 350 to 450 nm, the photoresist layer is formed of a positive-working photoresist material, and the photoresist layer has a thickness in a range from 290-350 nm.

27. A laser beam recording system for making a hybrid optical master disc from which a stamper can be derived for forming a hybrid optical recording disc, the system comprising:

a) a laser which emits a laser beam having a wavelength selected to provide activating radiation to a photoresist layer formed over a substrate of the master disc;

b) a first optical modulator for modulating an intensity of the laser beam between a lower intensity for exposing a groove in the photoresist layer

and a higher intensity for exposing a groove and a pattern of depressions in the groove in the photoresist layer, the pattern of depressions coincident with the groove, and the pattern of depressions exposed in response to an intensity-modulating signal;

c) a second optical modulator for frequency-modulating the intensity-modulated laser beam with a wobble-frequency in response to a frequency-modulating signal, the first and the second optical modulators operative concurrently to expose a continuous frequency-modulated groove having portions corresponding to a ROM region of a hybrid optical recording disc in which the intensity-modulated pattern of depressions is exposed;

d) means for rotating the photoresist master disc during exposure to the laser beam, and means for radially translating the master disc so that the laser beam incident on the photoresist layer will trace a continuous exposed spiral groove; and

e) a laser beam modulation control system including

(i) a clock;

(ii) an ATIP generator connected to the clock and operative to generate a frequency-modulating ATIP signal;

(iii) an EFM generator connected to the clock and operative to generate an intensity-modulating EFM signal in correspondence with digital data input signals;

(iv) a controller for providing logic control of temporal relationships between an intensity-modulating output signal of the EFM generator and a wobble-frequency-modulating output signal of the ATIP generator, the controller receiving flag pulses from the EFM generator and directing such EFM flag pulses to the ATIP generator, and the controller receiving flag pulses from the ATIP generator and directing such ATIP flag pulses to the EFM generator;

(v) a function generator for generating a time-varying signal at an output thereof in response to input pulse signals received from a first output of the controller;

(vi) a waveform modifier receiving the intensity-modulating EFM signal from the EFM generator and providing a selectable bias level signal such that an output signal of the waveform generator will have a selected bias level signal and the EFM signal superimposed thereupon, whereby the selected bias level signal provides the lower intensity of the laser beam for exposing the groove in the photoresist layer, and the EFM signal superimposed upon the selected bias provides the higher intensity of the laser beam for exposing the groove and the pattern of the depressions in the groove in the photoresist layer; and

(vii) a multiplexer operative to provide an intensity-modulating output signal to the first optical modulator in response to a multiplexer input control signal provided by a second output of the controller, the intensity-modulating output signal of the multiplexer either being the EFM signal superimposed upon the bias level signal provided by the waveform modifier or being the time-varying signal provided by the function generator in correspondence with the presence or absence of the multiplexer input control signal.

28. The laser beam recording system of claim 27 wherein the multiplexer provides the intensity-modulating output signal to an EFM driver which, in turn, actuates the first optical modulator for intensity-modulating the laser beam.

29. The laser beam recording system of claim 27 wherein the ATIP generator provides the frequency-modulating ATIP signal to an ATIP driver which, in turn, actuates the second optical modulator for frequency-modulating the laser beam with a wobble-frequency.

30. The laser beam recording system of claim 27 wherein the ATIP generator and the EFM generator further provide synchronization (SYNC) pulses which periodically synchronize a temporal relationship between the

intensity modulation and the frequency modulation along the exposed spiral groove.

31. The laser beam recording system of claim 27 wherein the laser beam has a wavelength in a range from 350 to 450 nm, the photoresist layer is formed of a positive-working photoresist material, and the photoresist layer has a thickness in a range from 290-350 nm.

32. The laser beam recording system of claim 27 wherein the time-varying signal generated by the function generator is a ramp signal.

33. The laser beam recording system of claim 32 wherein the ramp signal increases linearly with time.

34. The laser beam recording system of claim 32 wherein the ramp signal increases non-linearly with time.